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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/964,544      | 09/28/2001  | Gan-Moog Chow        | N.C. 82,637         | 3267             |

26384 7590 10/03/2002

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EXAMINER

SAVAGE, JASON L

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1775

DATE MAILED: 10/03/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Applicati n No.

09/964,544

Applicant(s)

CHOW ET AL.

Examiner

Jason L. Savage

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-- The MAILING DATE of this communication appears n the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                              | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)          | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____.                                   |

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***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 23 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In claim 23 Applicant claims that the multilayered coated material may consist of a metal-metal; however in independent claim 20 from which claim 23 ultimately depends, it states that the coated material contain an oxide. How can the composite be metal when one layer contains oxides?

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 19-25 are rejected under 35 U.S.C. 103(a) as obvious over Glumac et al. (US 5,876,683).

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Glumac teaches forming a nanophase thin films and multilayer coatings (col. 1, ln. 49-63). Although Glumac does not specifically state that the particles in the films and coatings are less than 100 nm in size, the disclosure that the formed structures are nanophase and nanocrystalline indicates that the particle sizes are within the claimed range. In the alternative, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nanophase films and multilayer coating have nanoparticles less than 100 nm in order to take advantage of the technologically attractive properties offered by nanoparticles.

Regarding the limitation in claims 19-25 that the film contain an oxide, Glumac teaches that it is known to produce nanophase powders of materials of zirconia and alumina (col. 1, ln. 20-27). It would have been obvious to one of ordinary skill in the art at the time of the invention to have produce a multilayer nanocomposite composed of particles of conventional nanophase material such as zirconia and alumina.

Regarding the limitation in claims 21-22 and 24-25 that the film is made of more than one layer of the material is graded, Glumac teaches that the nanophase coating may be multicomponent, multiphasic, compositionally modulated, or continuously graded structures (col. 5, ln. 28-39) which anticipates the claim. In the alternative, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nanophase coating having multiple layers which were of varying compositions or to have formed a functionally graded composite since it is specifically suggested by the reference.

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Regarding claim 23, Glumac is silent as to which materials are used to form a graded structure; however, the Markush group claimed by Applicant encompasses almost all conceivable groupings of materials and the graded multilayer structured formed by Glumac would inevitably be composed of one of the claimed groupings. In the alternative, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed a graded multilayer coating from any combination of materials that would provided enhanced properties, such as a ceramic-ceramic multilayer composite which exhibits enhanced thermal barrier properties, in order to form materials tailored made for their intended use.

### ***Response to Arguments***

5. Applicant's arguments filed 8-22-02 have been fully considered but they are not persuasive.

Applicant argues on page 4 of the Amendment that Glumac does not teach or anticipate the claimed oxide materials; however, the Examiner disagrees for the reasons set forth in the rejection above.

Applicant further argues on page 5 of the Amendment that the disclosure by Glumac's teaching that 'nanophase coatings and parts with... continuously graded structures can be produced' is not enabling but is prophetic. Applicant's argument is not persuasive since the reference clearly envisions that graded coatings may be produced and sets forth a method to

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produce a graded coating such as by using two or more combustion flame reactors. It would have been within the level of one of ordinary skill in the art to determine an optimal method and process parameters for forming a graded film.

Applicant also argues that the claims are distinct from Glumac since Glumac's reference is directed to a method for of [sic] nanoparticle oxide powders using the flame combustor while the claimed product is directed to a thin film or coating material. As was stated in the rejection above, Glumac specifically recites forming nanophase coatings, thin films and multilayers (col. 1, ln. 54-61). The scope of the reference is not limited to the preferred embodiments just as Applicant is not limited to claiming subject matter of their preferred embodiments. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed coatings and thin films from the nanocomposites disclosed by Glumac since it is specifically taught as structures that can be formed from the disclosed materials and methods.

### *Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

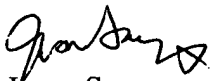
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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


7. Any inquiry to this communication or earlier communications from the Examiner should be directed to Jason Savage, whose telephone number is (703)305-0549. The Examiner can normally be reached Monday to Friday from 6:30 AM to 4:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Deborah Jones, can be reached on (703)308-3822.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703)308-2351.

  
Jason Savage

9-30-02

  
**JOHN J. ZIMMERMAN**  
**PRIMARY EXAMINER**